ECE 530 Cloud Computing

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High Performance Computing

- What is "high performance computing"?
 - The application of computer technology exceeding the capabilities of a desktop computer to solve problems that cannot be easily solved on a desktop computer.
- Includes the use of
 - Supercomputers
 - Cluster Computers
 - Distributed Computing
 - Grid Computing
 - Exotic hardware
 - E.g. Field Programmable Gate Arrays (FPGA)

Grid Computing

- Grid Computing
 - A high performance computing system built as a geographically distributed system from a collection of cluster computers, supercomputers, desktop computers, and storage systems, all connection via high speed networks.

Cyberinfrastructure

- What is "cyberinfrastructure"?
 - An information technology framework for discovery and collaboration
- Comprised of a collection of
 - Instruments and sensors
 - High performance computing systems
 - Data storage systems
 - Visualization facilities
 - All tied together by high speed networks.

NSF Atkins Report Cyberinfrastructure

Community-Specific Knowledge Environments for Research and Education (collaboratory, co-laboratory, grid community, e-science community, virtual community) Customization for discipline- and project-specific applications High Data, information, Collaboration Observation, Interfaces, performance knowledge visualization measurement. services computation management fabrication services services services services Networking, Operating Systems, Middleware Base Technology: computation, storage, communication

= cyberinfrastructure: hardware, software, services, personnel, organizations

Solution: Outsource Data Center

- Can reap economies of scale
- Because of scale, can afford specialized skills
- Web developers can concentrate on their core competencies that give them market advantage
- Shorter lead times
- Lower capital requirements
- Computing power becomes a commodity, as did electric power in early 20th century